

In modern society, the oil industry functions as an economic staple and a display of technological prowess. Its constituent companies between 1992 and 2006 earned over \$900 billion dollars, a massive monetary sum¹. The innumerable oil drills around the world typically strike oil at a depth of 5,711 feet, nearly 1.1 miles below ground². These two achievements of oil prospecting indicate the extent to which petroleum is sought today—by both drillers and consumers.

This modern situation derives from the innovation of Edwin Drake, the man credited with developing the first industrial oil drill and, in turn, the commercial petroleum industry. The Drake drill provided a sustainable source of petroleum, whereas previous oil had been gleaned in insignificant quantities from unpredictable ground-level pools³. Most importantly, however, this innovation provided the basis for an incalculable expansion of the American economy, based on a faith in this hydrocarbon. In providing abundant oil to a modernizing United States, the Drake drill created a commercial market that in turn led to an American dependence and lust for oil, based on dubious credence in its sustainability as an ideal energy source.

On August 27, 1859, Drake struck oil at a depth of seventy feet with his preliminary drill, following a process involving “as much...luck as...geology”⁴. His drill succeeded the exploratory efforts of the Pennsylvania Rock Oil Company, which had commissioned a report by geologist Benjamin Silliman on potential petroleum deposits in northern Pennsylvania⁵. The company’s report led it to sponsor “Colonel” Drake’s endeavors, which were initially vain and reliant on inefficient methodology. Only after he had failed to manually dig up oil in shallow trenches did this prospector create his namesake innovation⁶. Drake purchased a steam engine, creating a boring device similar to that displayed in Appendix A⁷. This mechanical tool reflected the integral role of industrialization and societal

¹ “Investment and Other Uses of Cash Flow By the Oil Industry, 1992-2006,” *api.org*, American Petroleum Institute, web, 25 March 2010.

² US Department of Energy, *Energy Explained*, US Energy Information Administration, web, 24 Jan. 2010.

³ McCage, Crystal, Ed., *Oil* (Farmington Hills, MI: Greenhaven Press, 2007) 18.

⁴ Adkins, Edwin, Hindsdale, Jeremy, *Extreme Oil*, Public Broadcasting Service, web, 22 Nov. 2009.

⁵ Adkins, Edwin, *Extreme Oil*.

⁶ “Edwin Drake,” *Public Broadcasting Service*, web, 24 Nov. 2009.

⁷ Adkins, Edwin, *Extreme Oil*.

modernization in Drake's efforts; a relatively new means of producing energy, steam power, ironically provided an innovation supplying a rival combustible commodity to coal. A basic steam pump, as seen in the design, proved integral to a relatively simple drilling mechanism, based upon a commonplace driving wheel. Likewise, these inner workings provided a drill that appeared almost rustic and dilapidated; however Drake, posing in front of his creation in the photograph of Appendix B, evidently felt his innovation bore greater worth perhaps than its unaesthetic appearance reflected. He, after all, desired a novel photograph of his achievement and committed himself to indebtedness for his creation⁸.

Personally, Drake had arguably little reason to be proud of his innovation. The Drake drill had been undertaken as a project intended to enrich both its sponsor company and its innovator⁹. It largely failed at both tasks, with Drake inevitably fired from his position and both the Rock Oil Company and this innovator losing their potential profits by not patenting the drill¹⁰. Instead, numerous independent prospectors sought oil in this rural area, developing what became Oil City, Pennsylvania in fittingly named Oil Creek valley¹¹. Ironically, Drake lived largely ignominiously, losing most of his personal assets to poor stock investments and his innovation to a lack of legal protection¹².

Immediately, however, Drake's drill introduced the American economy to a new, valuable commodity: oil, in quantities large enough for commercial profit¹³. Indeed, a market existed for oil in the early 1860's just as it does today. In an era before the advent of the incandescent light bulb, whale oil provided the primary source of lighting. Yet a reliance on this fuel had led to the depletion of whale populations, and, as an economist familiar with this topic notes, "there just wasn't enough whale oil" by 1859¹⁴. Kerosene, synthesized from petroleum, replaced whale oil as the predominant lighting fluid due to necessity—and financial convenience, considering kerosene cost less than one-fourth as much as whale

⁸ "Edwin Drake".

⁹ McCage, 28.

¹⁰ "Edwin Drake".

¹¹ "Oil Men Assemble to Honor Col. Drake, Pioneer Driller," *The Pittsburgh Press* (26 Aug. 1915), *Google News Archives*, web, 25 March 2010, 28.

¹² "Edwin Drake".

¹³ Harris, Walter, "Defining Moment: Edwin Drake strikes oil—and launches the petroleum industry," *Financial Times* (23 Oct. 2010), *ProQuest Newspapers*, web, 25 March 2010.

¹⁴ Lave, Lester, "Pittsburgh Renews Itself With 'Green' Technologies," *PBS NewsHour* 25 April 2008, *Public Broadcasting Service*, web, 25 March 2010.

oil¹⁵. Crude oil production rose exponentially, continually lowering the cost of this source of light. The individual Drake drill provided a meager fifty barrels of oil per day; yet in abundance, with drills across Pennsylvania by just the early 1860s, over 450,000 barrels of oil were produced per day in this state alone¹⁶.

Such large-scale production characterized the American industrial era; in this sense, the Drake drill functioned as an extension of a modernizing economy and did in fact create the commercial petroleum market. The United States consumed almost 200 million gallons of kerosene per year by just 1870, an indication of the rapid expansion of the oil industry from Drake's 1859 drilling and comparably punitive fifty barrel per day production rate¹⁷. Continuing this trend, in January of 1870, John D. Rockefeller founded the American Standard Oil Company, creating a petroleum conglomerate reliant upon the Drake drill. This iconic tycoon would control ninety percent of the expanding American petroleum industry by 1879—only twenty years after Drake's pioneering discovery¹⁸. In a limited span of time, dubbed American "big business" had shifted its focus to oil, alongside more iconic steel and railroad enterprises. As expressed in the critical cartoon of Appendix C, this new role of oil as a basis for monopolistic industry engendered public anger. An American public that had rallied behind drilling in auctions, such as the one denoted by the certificate in Appendix D, now, in stark contrast, depicted an oilman (Rockefeller) as draining America of its wealth through petroleum.

Hence, the Drake drill increasingly supported an industry separated from the consumer. Companies still attained profits through this innovation, yet oil drilling became a manifestation of elitist business power, not the efficient tool of consumer price reduction as it had seemed to present in the 1860s. In 1915, the *Pittsburgh Press* reported that a group of "old-time oil men" arrived at the site of Drake's original drilling site, in commemoration of August 27th, dubbed "Drake Day". Those present included mainly "prominent" men: a former Alaska governor, a respected oil driller, and the leader of a

¹⁵ Adkins, Edwin, *Extreme Oil*.

¹⁶ Adkins, Edwin, *Extreme Oil*.

¹⁷ Kovarik, Bill, "Whale Oil Myth," *Radford.edu*, Radford University, web, 25 March 2010.

¹⁸ Poole, Keith, "People and Events: John D. Rockefeller Senior, 1839-1937," *Public Broadcasting Service*, web, 25 March 2010.

national petroleum association¹⁹. By this time, the oil drill was a matter of corporate business and the average prospector, which created the initial Pennsylvania oil frenzy, had little role in its significance; ironically, Drake himself had humble origins, as a railroad conductor on a fledgling line²⁰. The oil industry did, however, encourage public favor. As depicted in Appendix E, advertisements proclaimed such impractical slogans as “Are you getting some of the millions”. This propaganda style indicates the extent of the oil drill into the national perspective: the individual, though realistically distanced from the profits of the drill, still was drawn by its alluring potential of even the outrageous “50 million dollars”.

Neither the Drake drill nor its closely-related successors exhibited prudence in their endeavors and both sought profits over conservative expansion. As illustrated by Appendix A, Drake’s drill proved an unsightly blemish on a forest setting; with excess lumber lying unused, “Crazy Drake” demonstrated little environmental concern²¹. Likewise, oil companies of the early twentieth century sold gasoline, a new petroleum product, though one containing unhealthful carbon dioxide, sulfur, and other environmentally hazardous compounds²². Fueling the new combustion engine, gasoline’s environmental impact has been popularly attributed to modern climate change, and, more tangibly, to the increased levels of greenhouse gases and acidic rain that the American Department of Energy now note as “negative impacts on the environment and human health”²³.

The oil drill, perhaps unwittingly to its creator, created an unbalanced terrestrial environment. Yet this innovation did, after all, primarily seek profit through mass-production, not conservationism or conservative business. As noted, Drake himself was bankrupted, and the oil tycoon Rockefeller amassed large debts to expand Standard Oil’s petroleum production²⁴. The oil drill created a desire for wealth and a sense that, as a business-interest writer described, “Oil was there, therefore oil must be used”²⁵. This led to one company’s rapid, nine-year growth from start-up enterprise to monopoly; this also created

¹⁹ “Oil Men Assemble”, *Pittsburgh Press*.

²⁰ “Edwin Drake”.

²¹ “Edwin Drake”.

²² US Department of Energy.

²³ US Department of Energy.

²⁴ Poole, “Rockefeller”.

²⁵ Harris, “The petroleum industry”.

consumer demand, initially relatively small, that has expanded to a modern US oil consumption rate of 19.5 million barrels per day²⁶. The oil drill, though evolved since Drake's era, is still manifest in the petroleum industry—a grouping which has an annual cash flow of \$1.77 trillion, an especially large sum considering the Drake drill only cost \$40,000 (in modern figures)^{27 28}. This is a large expansion over a 150 year period, in both consumer behavior and an industry, facilitated by the efficiency of the oil drill. Between just 1859 and 1862, oil production rose from negligible sums to three million barrels per day, encouraged by the production efficiency and resulting profitability of the Drake oil drill²⁹.

These results present tangible evidence of the precursor to contemporary drills; signs of profound oil consumption denote the consumer market first introduced by the first commercial drill. Without the original drill, the automobile, reliant on the gasoline-driven combustion engine, could not have flourished in the early twentieth century. Drake's model harvested petroleum abundantly enough to make the mass-produced motor vehicle a sustainable source of transportation, and automobiles in the United States expanded accordingly, from seventy-five thousand in 1905 to 17.5 million in 1925³⁰. The oil drill, indirectly, created the “most common mode of transportation in the United States”³¹. However, as noted, an increase in oil production and a rise in consumption results in the compounded emission of toxic compounds and a depletion of existing resources. Today, fifty percent of American oil derives from foreign sources; the original oil drill, capable of drilling seventy feet, could not withstand current need for over 5500 foot drilling depths. Many common products, including plastics, aviation fuel, and gasoline, rely on large quantities of oil that results in these drilling feats³². Oil is sought in such increasingly complex means, indicative of popular demand for petroleum and its products.

In such perspective, the oil drill primarily created an American economic reliance upon petroleum. Edwin Drake's drill, introduced in 1859, had produced a definable oil corporation by just

²⁶ US Department of Energy

²⁷ “Investment by Oil Industry”.

²⁸ “Edwin Drake”.

²⁹ Adkins, Edwin, *Extreme Oil*.

³⁰ “Model T Centennial,” *census.gov*, US Census Bureau, web, 24 Jan. 2010.

³¹ US Department of Energy.

³² US Department of Energy.

1870; by 1879, the drill formed the basis of a monopoly; by 1925, it fueled the American shift to the automobile; all the while, the industry exhibited aggressive commercial expansion techniques that did not exhibit prudent business or environmental practices. The oil drill today, comparatively evolved and now utilizing modern technology unavailable to Drake, nonetheless functions similarly as from 1859. In the foreign nations American oil increasingly depends upon, entire towns develop from oil resources and, more importantly, ambitious projects designed to harvest them, just as Pennsylvania's Oil City would develop with Drake's oil strike³³. Similarly, oil interests today explain their industry as "a matter of figuring out how to get the hydrocarbons out of...[an] area", exactly what the Drake drill accomplished and sought out³⁴. Oil today provides much of the allure it did during Drake's time, encouraged by early successes of the oil drill. The petroleum drill established a society notably dependent on its product; it provided oil with such an efficiency and reliability that it created its own consumer market, nonexistent prior to its inception.

Yet in the modern era, this reliance has developed into new controversy. The consumer market Drake's drill created has in turn formed "the energy crisis" of the modern era and environmental concerns along with this³⁵. The stability of this consumer market and this industry now lies in question, given American use of foreign producers and increasingly complex drilling; the reality of oil as a natural product, a hydrocarbon not a man-made substance, has become lucid. Drake's petroleum drill created a large consumer demand for a single product, ubiquitous in both contemporary and past society, that is not the sustainable, fantastical "black gold" it once appeared to be.

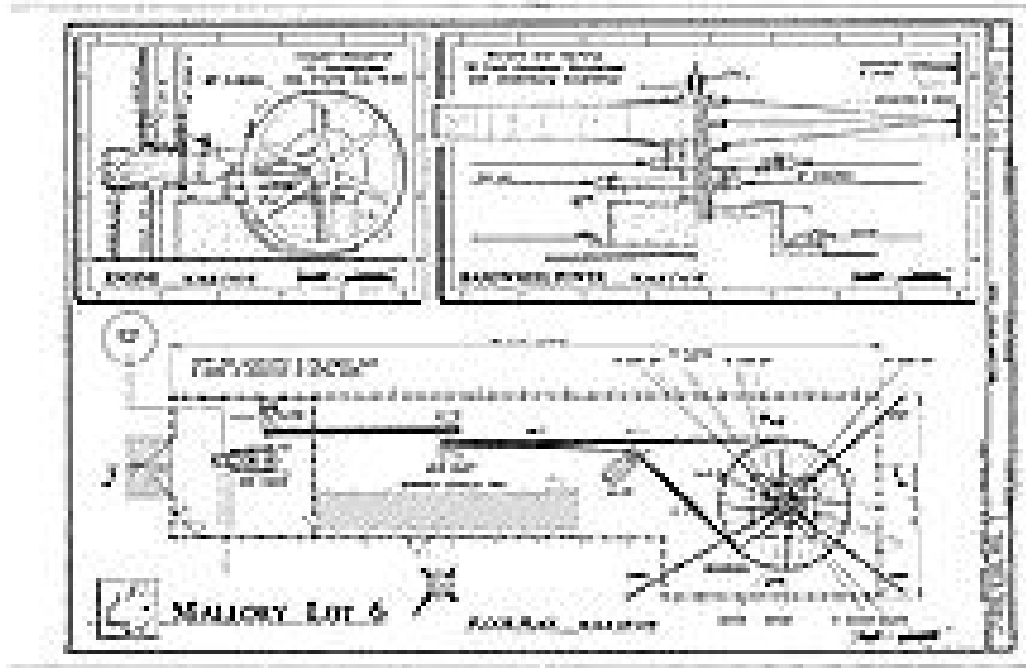
³³ Walia, Brij, personal interview, 26 Nov. 2009.

³⁴ "You can't accuse the U.S. oil and gas industry of conventional thinking," *aapg.org*, American Association of Petroleum Geologists, web, 25 March 2010.

³⁵ "Pittsburgh Renews Itself With 'Green' Technologies", *PBS NewsHour* 25 April 2008, *Public Broadcasting Service*, web, 25 March 2010.

Appendix

A)



A copy of designs to an oil drill very similar to Drake's. The mechanical nature of this device, as shown by this diagram, made it a tool of industrialization and a reflection of the modernization sweeping American society.

B)



An image of Edwin Drake's first oil drill in Pennsylvania. The wooden, simple appearance of this machine is very much an understatement to its eventual prowess and power in society.

C)



A cartoon lambasting John D. Rockefeller's Standard Oil Company. This corporation, ruled eventually by the Supreme Court an unconstitutional monopoly, bore a great amount of public anger at its size and power, demonstrating the vastness of this element of the oil industry and its economic power—as well as that to spawn controversy.

D)



An image of the auction form for an oil drill. The 1878 date of this transaction marks the rapid acceleration (less than twenty years) of oil drills into the forefront of business interest in the United States.

E)

California Stockholders Receive

50 Million Dollars

You Can Be One of Them

The Dividend-Paying Oil Companies

of California have paid to their stockholders during the last ten years the great sum of nearly 50 Million Dollars. A tremendous sum, you say. Yes, so it is. However, we are confident that the sum will be doubled in the next ten years. "What? Pay 100 Million Dollars in cash?" Yes, and perhaps more. Government statistics show that less than 1 per cent of California oil companies failed to succeed in the last few years; in fact, since the industry has been on a firm foundation, Dividends earned by these oil companies are receiving from 20 to 100 per cent annually. Now, these figures are facts and are public records. Figures recently filed show that the Union Oil Company of Los Angeles actually paid to its stockholders in 1906 A DIVIDEND OF 50 per cent, and in 1907 the ENORMOUS DIVIDEND OF NEARLY 140 per cent, and in addition placed a big sum in the company's reserve fund.

The Union Oil Company had its existence in Ventura county—the very county in which our property is located. In fact, our first wells will be drilled within a few hundred feet of the property controlled by this wealthy organization. They were the pioneers, they found the oil in paying quantities and they have really proved our ground as oil land. It remains for us to simply put down our wells and pump the oil into reservoirs ready for the market.

Are You Getting Some of the Millions?

Are you willing to invest a part of your surplus cash or earnings in a good, legitimate oil company composed of business men? Are you willing to be guided in an investment where your loose change should rapidly grow into many dollars and be a source of profitable income? THE CROWN OIL COMPANY has a long-time lease on 220 acres of oil lands in Ventura county, adjoining several groups of wells which have been producing for many years. The cost of drilling is nominal, pipe lines run past our land and we can market our oil the very day we get the first well.

We Will Get the Oil

And you will say as much the day you visit the property—and you are invited to go any day—just 50 miles from Los Angeles. We want you to investigate our company and our lands and visit the many wells around us.

We Are Preparing to Drill

And the work of drilling will be in charge of our field manager, Mr. A. A. Ward of Fillmore, California, whose reputation for honesty and competency none question. He has been drilling in Ventura county nearly 16 years and is familiar with our ground and has drilled many wells near us.



50,000 at 7 Cents Per Share

We are offering 50,000 shares at 7c cash, 8c on the payment plan, per share, subject to immediate advance. We honestly believe the money put into CROWN OIL STOCK now will pay you a handsome profit. Our idea is to make this company the foundation for a BIG OIL COMPANY and all those who buy now will share in the profits from the start. The stock is non-assessable, and no promotion stock. EVERY SHARE OF CROWN OIL STOCK WAS PLACED IN THE TREASURY. If you own one share or many shares you will receive your profits according to your holdings.

Acreage One-Half Mile Wide and One Mile Long

Now, the CROWN OIL COMPANY has a long-time lease on an acreage of oil land one-half mile wide and one mile long, adjoining many groups of wells that have been producing light oil for many years, and it is asserted by those who have been on the ground that we have "A MILE OF OIL LAND." We propose to drill well after well as rapidly as our funds will permit, and, as above stated, we expect not less than 100 barrels daily per well, and many of them may produce 600 to 1000 barrels daily. What then will stockholders who purchased our stock at 7 cents per share realize on their investment? We will leave that to you. We have extended the offer that you might be one of our partners in this oil company and share with us the profits. Will you accept?

We Want You in Our Company

We want to make you money, and we are absolutely confident that WE CAN MAKE YOU MONEY. Write to us, and we will tell you all about the wonderful possibilities of oil as a big money-maker. If you are convinced we have what we claim, send your orders direct to the company, inclosing the cash at the rate of 7c per share cash, 8c per share on the payment plan, or request that we reserve a few hundred or thousand shares until you investigate. We want you to understand that when you buy stock in our company you at once become a partner with us.

Send in your order at once and ask your friends to write to us for free printed matter, maps, photo cuts, etc.

RESERVE BLANK

CROWN OIL CO., 620-622 Laughlin Bldg., Los Angeles, Cal.

Gentlemen: Reserve for me shares of the capital stock of the Crown Oil Co. until I investigate fully. Send me printed matter.

Name.....

Address.....

(ASK FOR THE "CALIFORNIA RED BOOK"—IT IS FREE)

Crown Oil Company

620-622 Laughlin Building Los Angeles, California

This image from the *Los Angeles Herald* in 1909 reveals the allure of the oil drill to common investors. As an advertisement, this image characterizes an American viewpoint of the oil drill as an economic tool.

Primary Sources

Bone, J.H.A. *Petroleum and Petroleum Wells*. Philadelphia: J.B. Lippincott & Co., 1865. *Google Books*. Web. 8 May 2010.

Davenport, Homer. *Standard Oil*. Prints and Photographs Div., Lib of Cong. Web. 3 Dec. 2009. <<http://www.loc.gov/pictures/item/2005685937/?sid=6f39bde20c751b5b5b5b73a0abbf8d44>>.

This image, Appendix C, is of a political cartoon lambasting the efforts of Standard Oil and John D. Rockefeller, its controller. The source's bias actually constitutes its purpose: the editorial nature of the image portrays the popular (or at least prevalent) perspective regarding oil less than half a century after its outset. This image helped reinforce the immediate transformation of the American economy resulting from Drake's industrial experiment. Further, this denotes the rise of oil from its relatively humble, small-scale outset to a matter of controversy and corporate monopoly. The image was provided by the Library of Congress image services, which includes many iconic or relevant digital images from US history.

Ferris, A.C. Letter. *New York Times* 27 Nov. 1882. *query.nytimes.com*. Web. 8 May 2010.

Klein, Henry H. *Standard Oil or the People*. New York: 1914. *Google Books*. Web. 9 May 2010.

"Leading the Way." *Chevron*. Chevron Oil Company. Web. 9 May 2010. <<http://www.chevron.com/about/leadership/history/1876/>>.

Lester, Lave. "Pittsburgh Renews Itself With 'Green' Technologies." *PBS NewsHour*. 25 April 2008, *Public Broadcasting Service*. Web. 25 March 2010. <http://www.pbs.org/newshour/bb/environment/jan-june08/green_04-25.html>.

This source represents an interview within a greater secondary source. Lave Lester is a noted economics professor at Carnegie Mellon University and noted for his expertise on the development on Pennsylvanian industry—prevalently oil. His commentary represents that of an expert on a subject I was documenting: the necessity of oil in the American economy as a source of lighting, given the depletion of whale oil resources. PBS—a company noted for informational integrity and a nonbiased factual news source—interviewed him, and I quoted his commentary through their transcript. His commentary, due to source accreditation (he is, coincidentally, referenced in the above article by Kovarik as an authority on the subject), can be interpreted as primary, describing interestingly not only past assumption, but current behavior.

Los Angeles herald. (*Los Angeles [Calif.]*) 1900-1911, December 19, 1909, Image 226. Chronicling America, Lib. Of Congress. Web. <<http://chroniclingamerica.loc.gov/lccn/sn85042462/1909-12-19/ed-1/seq226/?words=dollars+Dollars+Million+50+Millions>>.

This source, a newspaper ad from 1909 and Appendix E, revealed the extent of the appeals of oil to the American public. The petroleum industry, in its remarkable claims on this noticeable advertisement, reveals its own prowess but also indicates a true American view of the oil drill as a means towards profits and fast earnings. As with several of my sources, this was obtained through the historical image service of the Library of Congress, a government division.

Mather, John. Pennsylvania Dept. of Conservation and Natural Resources. Web. 3 Dec. 2009.
<<http://www.dcnr.state.pa.us/topogeo/oilandgas/drake.aspx>>.

A somewhat famous image of Drake and his oil drill, Appendix A, this primary source deserves note for its revelations about the first oil drill. Unbiased from its objective viewpoint, this image helped develop an interpretation of Drake as a creator, or an innovator, who took some pride (as per his stance) in his formation. He seems to realize the potential of this device. The photograph helps depict the rudimentary outset of the oil drill, especially compared to the massive extraction purposes outlined in other sources (primary) only decades after. Further, it implies a somewhat intimate status between Drake and his innovation that opposes later era's detachment into inanimate corporate control over vast fields of drills. As with the majority of the Appendix, this image was digitized by the Library of Congress.

"Oil Men Assemble to Honor Col. Drake, Pioneer Driller." *The Pittsburgh Press* (26 Aug. 1915): 28. *Google News Archives*. Web. 25 March 2010.
<<http://news.google.com/newspapers?id=b8UaAAAAIIBAJ&sjid=h0kEAAAAIIBAJ&pg=5943,6319086&dq=oil+men+come+to+honor+col+drake&hl=en>>.

In this source, the web service Google did function in a minor part. However, I did not use Google's informational capacity, merely its database services, akin in quality and lack of bias or corruption to any other such service. In essence, the source is the primary news article, not Google which is merely an intermediary to access this. More importantly, this new article from 1915 recounted a celebration of the fifty-sixth anniversary of the Drake oil drill. Its language revealed a public respect for this achievement, but also the notoriety of the individuals present at this ceremony. This fact, revealed through this direct account of an event, indicated the transformation of the oil drill from a matter of common speculators to one of business, privileged interests.

"The Pioneers of Oil Creek." *The New York Times* 22 June 1880. *Query.nytimes.com*. Web. 9 May 2010.
<<http://query.nytimes.com/mem/archive free/pdf? r= 2&res=9D00E1D91630EE3ABC4A51DFB066838B699FDE>>.

Robbins, Frank. *The Oil Exchange*. 1878. Prints and Photographs Div., Lib of Cong. Web. 3 Dec. 2009.
<<http://www.loc.gov/pictures/item/2008678996/resource/stereo.2s01746/?sid=240e3826193716f26d0ae22cb02a13f6>>.

This image of an auction document, appearing in Appendix C, represents in its subject material the development of oil production even within twenty years of Drake's 1859 drilling. The author merely captured a real document on film, giving him credibility from objectivity and from not tampering with the document proper. The certificate portrayed names an oil field producing over ten times the capacity of Drake's drill. Given its close chronological proximity to Drake's efforts, this marks the fast growth of the oil industry. Evidently, given this information, the industrial potential of the drill was irrefutable and quickly manifested itself: oil was viewed as an industrial product at its conception. The Library of Congress provided this image.

South Penn Oil Company, Mallory Lot 6 Lease, Watsonville Field, Klondike vicinity, McKean County, PA. Prints and Photographs Div., Lib of Cong. Web. 3 Dec. 2009. <<http://memory.loc.gov/cgi-bin /displayPhoto.pl?path=/pnp/habshaer/pa/pa3500/pa3552/sheet&topImages=00001a.gif&topLinks=00001r.tif,00001a.tif&title=&displayProfile=0>>.

This Library of Congress-provided diagram, Appendix B, illustrates the method Drake used to drill for oil. Its publication, presumably after the pioneering Drake drill, indicates the popularity of industrial-quantity oil exploration. This particular methodology, in providing the highest yield, took hold in the industry, forming the basis of the oil industry further. Oil was, as this common diagram reveals, a staple source of potential profits and its economic value thus was towards profit. The drawing, analogous to Drake's method, gains credibility due to its governmental recognition as commonplace in the late nineteenth century.

Walia, Brij. Personal Interview. 26 Nov. 2009.

As an engineer on several oil infrastructure projects, this interviewee constitutes a reputable source for information on the often extreme efforts taken towards oil production and refinement. He discussed his efforts in the Middle East as an engineer on a project along the Red Sea to develop an oil refinement center, based off of then newly discovered oil sites in the oil-rich Arabian Peninsula. His recounting of this experience included the effects of the project: innumerable foreign engineers creating a small "boom town" effect, just as Drake's drill achieved in Pennsylvania in 1859. This indicated to me the connection between oil in past history and modern day and the continued allure of oil resources.

Secondary Sources

Adkins, Edwin, Hindsdale, Jeremy. *Extreme Oil*. Public Broadcasting Service. Web. 22 Nov. 2009. < <http://www.pbs.org/wnet/extremeoil/index.html> >.

"Edwin Drake." *Public Broadcasting Service*. Web. 24 Nov. 2009. < http://www.pbs.org/wgbh/theymadeamerica/whomade/drake_lo.html >.

As an overview of Edwin Drake's efforts, this article identifies the effects of Drake's revolutionary oil drill. The source's relative unbiased nature derives from its informational purpose and its parent provider (PBS, a non-profit public service and information provider accredited for nonbiased information and analysis). This text highlights the profits Drake expected from his extraction, and reveals this initial innovation towards oil harvesting to have centered on profits. This pioneer of drilling also established, therefore, the precedent for future oil companies' actions, notably contemporary corporations and early twentieth century Standard Oil, illustrated in other sources. I used this source primarily as a reference on basic biographical information on Drake himself and certain minute details regarding his drill, as part of an outline of the nature of this innovation and the causes behind its creation.

Harris, Walter. "Defining Moment: Edwin Drake strikes oil—and launches the petroleum industry." *Financial Times* (23 Oct. 2010), *ProQuest Newspapers*. Web. 25 March 2010.

Though potentially and generally biased, this newspaper article provided a business perspective on the oil drill. More precisely, its language directly revealed the consumer market behind the oil drill that still, as the article noted, exists today. This information, not wholly historical, can be taken from a source, the *Financial Times* of the UK, with noted credentials in analyzing such concerns; this newsmagazine focuses on economic interests, indicating its use in my essay as an example of a business perspective on the oil drill. In essence, the appropriate perspective of the information I gleaned from the article reduces its dubiety as a source.

“Investment and Other Uses of Cash Flow By the Oil Industry, 1992-2006.” *Api.org*. American Petroleum Institute. Web. 25 March 2010.
<http://www.api.org/statistics/earnings/upload/earnings_perspective.pdf>.

This website, sponsored by the American Petroleum Institute (a nonprofit group describing information pertaining to the oil industry; it is less subject to informational inaccuracy due to outside, profit-driven pressures and also devoted to the topic I cover), provided me with pieces of information regarding the modern oil industry. It listed the profits and cash flow of this business, two relatively neutral pieces of information that nonetheless aided my conclusion regarding the growth of the petroleum industry.

Kovarik, Bill. “Whale Oil Myth.” *Radford.edu*. Radford University. Web. 25 March 2010.
<<http://www.radford.edu/wkovarik/misc/blog/8.whaleoil.html>>.

This article published on an online webpage of Virginia’s Radford University provided certain minute details regarding whale oil consumption and costs as kerosene was introduced to the American consumer market. The source gains initial credibility from its educational sponsorship; its author is a professor noted for historical writings. His argumentative points I leave out of my research from this source, and thus aid its credibility further.

McCage, Crystal, Ed. *Oil*. Farmington Hills, MI: Greenhaven Press, 2007. Print.

An informational book, this text is both secondary and quite unbiased. Any opinionated sidebar arguments receive apt countering from other such articles; as such, the only biased elements are negated by prompt response. This book provided information regarding the chemical composition and potential of oil. It illustrated, more scientifically, why Edwin Drake saw potential in oil and developed a means of extracting it en masse. This text identified quite specifically the role of the large-production oil well in oil resource development.

“Model T Centennial.” *Census.gov*. US Census Bureau. Web. 24 Jan. 2010. <http://www.census.gov/Press-Release/www/releases/pdf/cb08ffse-04_modelt.pdf>.

As a minor part of my research, I wanted to draw a connection between the rise of American automobile usage and the oil drill. As this article (that lists statistics comparing the American culture of the early 1900’s to present) elucidates, the rise of the automobile, numbering according to this source over nine million in 1920, paralleled loosely the rise of the prominence of the oil industry. This conclusion served further as a partial basis for my claim that the oil drill’s essential provision of oil to society engendered the American society we witness today. Again, in its purely informational capacity, this source gains credibility and in comparative intention compares to my own, providing a somewhat connected purpose between my essay and this source (which enhances its effectiveness).

“Pittsburgh Renews Itself With ‘Green’ Technologies.” *PBS NewsHour*. 25 April 2008, *Public Broadcasting Service*. Web. 25 March 2010. <http://www.pbs.org/newshour/bb/environment/jan-june08/green_04-25.html>.

Primarily serving to provide the above interview with Lave Lester, this source mainly provided an explicit quotation of an American “energy crisis”. Though a media source, it served little informational end, though did influence my impression of the effects of the Pennsylvania oil industry and thus intangibly influenced my essay.

Poole, Keith. "People and Events: John D. Rockefeller Senior, 1839-1937." *Public Broadcasting Service*. Web. 25 March 2010.
<http://www.pbs.org/wgbh/amex/rockefellers/peopleevents/p_rock_jsr.html>.

Although it discusses primarily oil tycoon John D. Rockefeller, this informational article—again from PBS did provide the majority of my information regarding the formation and success of Standard Oil Company (Rockefeller's creation). The historical article described the rise of this corporate entity resulting from Rockefeller's ambitious drive for profits and industrial success; I related this to the economic effects of the oil drill and its creation of a definable petroleum industry.

US Department of Energy. *Energy Explained*. U.S. Energy Information Administration. 24 Jan. 2010. <<http://www.eia.doe.gov/energyexplained/index.cfm>>.

"You can't accuse the U.S. oil and gas industry of conventional thinking." *Aapg.org*. American Association of Petroleum Geologists. Web. 25 March 2010.
<http://www.aapg.org/explorer/2007/04apr/beyond_barnett.cfm>.

This article, though evidently biased, provided intentionally biased information. The site, sponsored on a scientific, factual and informational pretense, provided a quotation stating, essentially, that oil drilling was the primary focus of the oil industry and that efforts were always needed to find new ways to extract petroleum. This piece of text was used in my essay to compare modern oil technology to that of Edwin Drake's time period, when he was recruited by the Pennsylvania Rock Oil Company to find a way to extract oil—nearly the same as my quotation. The nonprofit, informational purpose of this website indicates its validity; moreover, I gained little historical information from it, aside from an indication of the current situation of the modern petroleum industry, partially alluded to in my essay.